NCCS Snapshot
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NATIONAL CENTER
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Oak Ridge National Laboratory
U.S. Department of Energy

Researchers Spin Better Pulsar Explanation

- Pulsars are left over from core-collapse supernovas
  - *Conventional wisdom:* Pulsar spin comes from the spin of the original star
  - *Better explanation:* The core-collapse shockwave creates two rotating flows, with pulsar spin created by the inner flow
  - *Why it's better:* It explains the range of observed pulsar spins, while the conventional wisdom explains only the fastest spins
- Three-dimensional simulations run on the Cray X1E (Phoenix)
- Tony Mezzacappa, ORNL, and John Blondin, North Carolina State, have published their findings in the January 4, 2007 issue of *Nature*

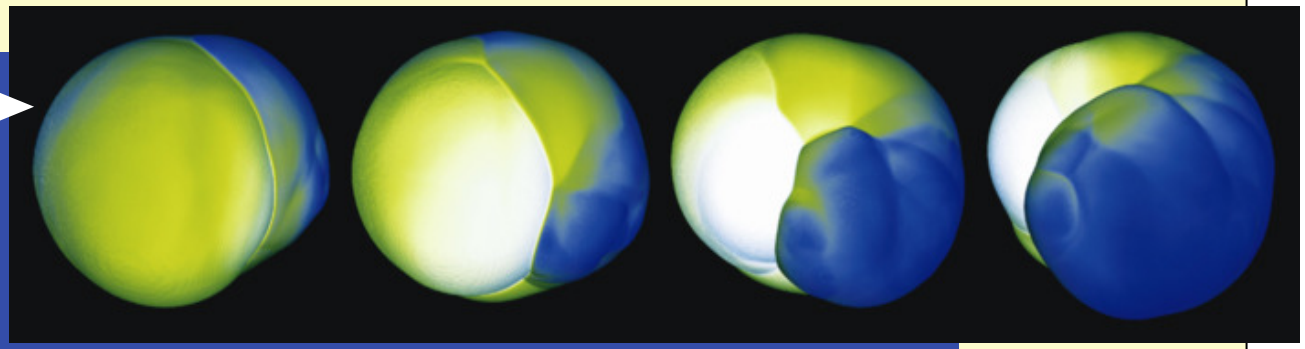

Image Courtesy of John Blondin

This visualization shows the propagation of a stationary accretion shock instability wave in a core-collapse supernova. The leading edge of a spiral flow near the surface of the supernova shock is marked by the blue area in the figure. It is accompanied by a second flow spinning in the opposite direction underneath. This second spinning flow is responsible for imparting the pulsar spin, according to three-dimensional simulations performed at Oak Ridge National Laboratory.